

WOBBLING SPRINKLER HEAD

1 BACKGROUND OF THE INVENTION

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3 The present invention relates to a wobbling
4 sprinkler head and especially to a wobbling sprinkler
5 head for use in irrigation systems and the like.

6 There have been a number of wobbling sprinkler
7 heads used in the past in which the water distribution
8 head of the sprinkler, instead of being rotated in a
9 smooth rotation or instead of following one of the
10 other sprinkler patterns, has a water distribution
11 head which wobbles in a rotating fashion to provide a
12 more even distribution of water. In the Clearman
13 patents, U.S. Pat. No. 4,487,368 and U.S. Pat. No.
14 4,773,594, a control pattern wobbling sprinkler is
15 provided in which a rotating sprinkler head has a
16 wobbling water distribution head mounted on the end
17 thereof which has a plurality of vanes formed in the
18 wobbling portion of the head to force a wobbling
19 motion which results from the loose connection between
20 the distribution head and the supporting arm of the
21 sprinkler head. In the sprinkler of these two
22 patents, a base is provided for ground support and a
23 rotating sprinkler head has the end of the rotating
24 arm bent at an angle so that the loosely attached
25 wobbling head tilts groundward when not being used.
26 Upon initiation of water under pressure to the head,
27 the head is already in a cocked position and forces a
28 rotating action which causes a wobbling rotation of
29 the water head portion. In the J.M. Hait patent, U.S.
30 Pat. No. 3,009,648, an irrigation system is provided
31 in which the sprinkler head has a rotating stream of
32 water issuing therefrom but allows a deflection head
33 to move back and forth. In J.O. Hruby, Jr., U.S. Pat.

1 No. 3,034,728, a lawn sprinkler is shown which has a
2 centrally disposed and vertically extending stem which
3 is made to rotate by the action of the water passing
4 through the sprinkler. The stem is loosely mounted
5 and has an uneven deflecting portion to produce a
6 rotating action of the spray. In the M.S. Aubert
7 patent, U.S. Pat. No. 3,091,400, a dishwashing machine
8 has a rotary wobbling spring head which is driven by
9 the water momentum to wobble the head in a dishwasher.

10 In Applicant's U.S. Patent No. 5,381,960, a
11 wobbling irrigation sprinkler head includes a magnet
12 for the initial tilt in a wobbling irrigation
13 sprinkler head for use on a self-propelled mechanical
14 moving irrigation system, such as a center pivot field
15 irrigation system, having the wobbling sprinkler head
16 facing downward from the water supply conduit. This
17 sprinkler head produces a wobbling motion as a result
18 of the nozzle directing water onto a deflector pad
19 having a predetermined shape with water deflecting
20 grooves which rotates and wobbles the water deflecting
21 head. A magnet is mounted in the sprinkler head base
22 to attract a ferric metal washer mounted in the
23 wobbling deflecting head to tilt the wobbling water
24 deflector head relative to the base to cock the
25 deflector head to initiate the wobbling in the
26 deflector head.

27 In Applicant's prior U.S. Patent No. 5,950,927
28 for a Wobbling Sprinkler Head, a wobbling irrigation
29 sprinkler head is for use on a self-propelled
30 mechanical moving irrigation system, such as a center
31 pivot field irrigation system, in which the sprinkler
32 heads face downward from the water supply conduit.
33 This sprinkler head produces a wobbling motion as a

1 result of the nozzle directing water onto a deflector
2 pad having a predetermined shape with water deflecting
3 grooves which cause a rotation and wobbling of the
4 water deflecting head. The wobbling motion is
5 produced by a wobble mechanism which has a pair of
6 interacting wobble generating members, one mounted on
7 the water deflecting head and the other mounted on the
8 sprinkler body to keep the water deflection head
9 titled at an angle to the water exiting the water
10 nozzle. The interaction of the protruding members
11 forces the deflection head to start wobbling as the
12 deflection head rotates and maintains the wobble. The
13 water deflection head is blocked from the center axis
14 position to keep the water deflecting surface at an
15 angle to the stream of water being emitted from the
16 nozzle.

17 One of the problems that occurs with a commercial
18 wobble sprinkler head is the vibration created in the
19 sprinkler head by the wobbling action which can result
20 in wear and premature failure of a wobbling sprinkler
21 head. The present invention is a wobbling sprinkler
22 head which reduces the vibration in the sprinkler
23 head. A water deflection head is rotated by a stream
24 of water from a water nozzle.

25 In Applicant's U.S. Patent No. 6,176,440, the
26 interaction of a pair of wobble generating members
27 forces the water deflection head to start wobbling as
28 the deflection head rotates. The water deflection
29 head is prevented from the center position by the
30 interacting wobble generating members to keep the
31 water deflecting surface at an angle to the stream of
32 water being emitted from the nozzle. Once the
33 deflection head starts rotating, the protruding

1 members do not touch since the circle of rotation is
2 outside a stationary wobble generating member. A
3 predetermined mass is removably attached to the
4 sprinkler head along the base of the sprinkler head to
5 dampen vibrations in the sprinkler head generated by
6 the wobbling deflector head. The mass is removably
7 attached to allow for the change of the mass depending
8 upon the operating conditions of the sprinkler head.

9 In the present invention, a wobbling sprinkler
10 head has a wobbling deflector having a skirt extending
11 outwardly therefrom to counterbalance the deflector
12 head and reduce vibration.

13

14 SUMMARY OF THE INVENTION

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16 A wobbling irrigation sprinkler head for
17 attachment to a water conduit has a wobbling sprinkler
18 head facing upward from the water supply conduit. The
19 sprinkler head has a base having an attachment portion
20 for attaching to a water source and a nozzle mounted
21 to the base for directing water therethrough. A
22 wobbling water deflector head is movably attached to
23 the base and has a water deflector pad thereon having
24 a deflector surface of predetermined shape to deflect
25 water being emitted from the nozzle to rotate the
26 wobbling water deflector head. A counterbalancing
27 skirt extends from the water deflecting head around a
28 portion of the base and spaced from the base for
29 rotation with a wobbling water deflector head so that
30 counterbalancing the skirt counterbalances the water
31 deflector head to dampen vibration forces in the
32 deflector head. The counterbalancing skirt flares
33 from the water deflecting head adjacent to and

1 surrounding the base and has a plurality of open areas
2 therein and is positioned for the balancing point of
3 the wobbling deflector head to be below the rotation
4 point of the wobbling deflector head.

5
6 BRIEF DESCRIPTION OF THE DRAWINGS

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8 Other objects, features, and advantages of the
9 present invention will be apparent from the written
10 description and the drawings in which:

11 Figure 1 is a side elevation of a portion of a
12 water conduit having the present sprinkler head;

13 Figure 2 is a perspective view of the wobbling
14 sprinkler head in accordance with the present
15 invention;

16 Figure 3 is an exploded view of the sprinkler
17 head of Figure 2; and

18 Figure 4 is a perspective view of a wobbling
19 water deflector head of Figures 1-3.

20
21 DESCRIPTION OF THE PREFERRED EMBODIMENT

22
23 Referring to Figure 1 of the drawings, a portion
24 of a water conduit of an irrigation system 10 has a
25 central irrigation conduit or water supply pipe 11
26 having a plurality of sprinkler heads 12 attached
27 thereto in a spaced relationship to each other. In
28 this case, each sprinkler head 12 extends from the top
29 13 of the pipe 11 and includes a pipe coupling 14
30 attached thereto. A pipe 15 may be any length desired
31 and has a U-shaped bend and has the sprinkler head 12
32 attached thereto.

1 The sprinkler head 12 as seen in Figures 1-4
2 includes a base portion 16 having a wobbling water
3 deflector head 17 rotatably attached to the base 16.
4 The base 16 has external threads 18 for connecting to
5 a water supply for directing water through a nozzle
6 20. The nozzle 20 has a flange 21 and gripping ridges
7 22 thereon. The wobbling water deflector head 17 has
8 an opening 23 therein for mounting onto the base 16
9 supporting ring 24. The ring 24 has internal threads
10 25 for attaching external threads 26 of a nozzle 20
11 thereinto. The wobbling water deflector head 17
12 includes a plurality of posts 27 extending from a base
13 circle 28 and attaching to a water deflector pad 30.
14 The water deflector pad 30 has a plurality of arcuate
15 grooves 31 mounted therein for directing water from
16 the nozzle 20 thereagainst. The deflector pad 30 has
17 a plurality of apertures 32 therein for attaching to
18 the posts 27 with a threaded fastener passing through
19 the apertures 32 and into the threaded openings 33.
20 The ring 28 of the deflector head 17 has a flared
21 skirt 34 extending therefrom which has a plurality of
22 open areas 35 therethrough so that when attached to
23 the sprinkler head 12, as shown in Figure 2, the
24 wobbling water deflector head 17 skirt 34 extends
25 around the base 16. The wobbling water deflector head
26 17 is held to the base 16 by the opening 23 fitting
27 over the support sleeve 25 in a loose manner to allow
28 it to rotate and wobble thereon. The deflector head
29 17 is held to the base 16 with the nozzle 20 which has
30 the threads 26 threaded into the threaded opening 25
31 and which has a flange 21 larger than the opening 23
32 to hold the deflector head in a manner that can rotate
33 and wobble. The flared skirt 34 adds a flared weight

1 extending below the main portion of the water
2 deflector head in the opposite direction from the
3 water deflector pad 30 to counterbalance the water
4 deflector head to dampen vibration forces in the
5 deflector head when the deflector head is rotating in
6 a wobbling fashion.

7 In operation, the water under pressure passing
8 through the frame 16 from a water source, such as the
9 pipe 11 of Figure 1, is directed through the nozzle 20
10 and onto the deflector pad 30 which, by virtue of the
11 grooves 31, forces a rotation of the wobbling water
12 deflector head 17 with the open area 23 riding on the
13 support ring 25. The deflector head and expelled
14 water are acting in unison to create an unbalanced
15 force in the same direction, by attaching the
16 outwardly tapered skirt 34, the balance point of the
17 rotating water deflector head 17 is moved below the
18 rotation point. Moving the balance point
19 approximately .5 centimeters (.2 inches) below the
20 rotation point of the sprinkler head 12 reduces or
21 eliminates the vibration in the wobbling water
22 deflector. The angle of the tapered skirt 17 is
23 important in that a highly flared skirt places the
24 rotational mass away from the center point of
25 rotation. Slow rotation rates create a larger
26 vibration amplitude and thus more damaging vibration
27 so that by keeping the taper as slight as possible,
28 the rotation mass is kept closer to the center of
29 rotation and yields a slightly faster but smoother
30 rotation rate.

31 In the present sprinkler head, as illustrated, 10
32 degrees is the minimum angle that will clear the
33 mounting base but other sprinkler designs might

1 utilize smaller or larger angles. The present
2 sprinkler is made of all plastic components except for
3 threaded fasteners but any material can be utilized
4 without departing from the spirit and scope of the
5 invention. In addition, less weight is needed in a
6 counterbalancing skirt which translates into lower
7 starting pressures and improved startability of the
8 wobbling of the wobbling water deflector head.

9 It should be clear at this time that an improved
10 wobbling irrigation sprinkler head has been provided
11 which uses a flared skirt which counterbalances the
12 water deflector head to dampen vibration forces in the
13 deflector head. However, the present invention is not
14 to be construed as limited to the forms shown which
15 are to be considered illustrative rather than
16 restrictive.